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STRATEGY RESEARCH PROJECT

THE WATER CONFLICT IN THE MIDDLE EAST

BY

BRIGADIER GENERAL MOHAMED EL SAYED EISA KANDIL Egyptian Army

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by

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ABSTRACT

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The water conflict in the Middle East is reaching a crisis peak. The region suffers from a shortage of water, a high rate of population growth and the absence of a clear criteria for sharing waters within the region. The Arab-Israeli peace process has created the climate for reaching a reasonable solution to water disputes. The United States, with its global leadership and regional influence, has an important role to play to avert Middle East conflict over water. This study discusses the facts bearing on the problem, the main water issues in the Middle East, evaluation of existing and potential water projects, policy options, water and war, criteria for sharing international waters, water and peace, and the United States' role.

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INTRODUCTION

The management of water resources is a problem of considerable dimensions. Only three percent of the water on Earth is fresh. Of this, more than two percent is locked away in the polar ice caps, glaciers, or deep groundwater aquifers and is therefore unavailable to satisfy the needs of people. Furthermore, only 0.36 percent of the world's water in rivers, lakes, and swamps is sufficiently accessible to be considered a renewable fresh water resource.¹

Precipitation in large sections of the world is inadequate to support substantial agriculture, populations or industry. Migration, along with exponential population growth, have increased the number of people living in marginal, arid lands where survival depends upon the availability of scarce water resources.²

The shortage of water is reaching a crisis stage in the Middle East. The vice president of the World Bank, Ismail Seragelein, captured the current wisdom on natural resources issue when he said, "many of the wars of this century were about oil, but wars of the next century will be about water." ³

The population of the Middle East* is expected to double in next twenty five years.

The total population of the region is expected to approach 240 million by 2010. Cities such as Cairo, Damascus, Tehran, and Amman are expected to triple or quadruple in size.

^{*} The Middle East refers to countries of the Arabian Peninsula, Egypt, Iran, Israel, Iraq, Jordan, Lebanon, Palestine, Sudan, and Syria.

Demands for fresh water will thus escalate, as will demands for urban infrastructures such as sewage systems and water-purification devices. Demands for water-intensive industries such as agriculture to provide food for increasing populations will also soar.⁴

Water is an essential resource for which there are no substitutes. The fact that water does not lend itself to international trade complicates the water-resource scarcity problem. If present consumption patterns continue, emerging water shortages combined with deterioration in water quality will lead to more desperate competition and conflict. Mutual understanding among the competing parties, with international support, will lead to a permanent, just and stable solution for these potential conflicts.

FACTS BEARING ON THE PROBLEM

The current rate of more than two percent in annual population increase can have catastrophic consequences for Middle Eastern countries. Most of these countries are caught in a population spiral that is out of control. As domestic agricultural and industrial demands mount, many of them will experience extreme difficulty in providing sufficient quantities of water to their citizens.⁵ Furthermore, the amount of fresh water used in agriculture has gone up in order to meet the needs of increased population.

Poorly managed and inefficient water facilities--dams, water and wastewater treatment plants, industrial facilities and irrigation schemes--have emerged as another priority. Although U.S. Agency for international Development (USAID), the World

Bank and other international agencies have worked assiduously to create water infrastructures through the Middle East, most of these facilities now operate well below peak efficiency levels.⁶

Purifying water after its industrial use requires costly and sophisticated technology that is not widely available in the Middle East. A major problem of industrial use of water is the fact that it creates toxic and hazardous pollutants that render waste water unfit for subsequent human consumption or use in the agriculture sector; these pollutants can also permanently pollute aquifers. Governments tend to favor industrialization over water quality, despite the fact that water-borne health threats can often create long-term health problems.⁷

Finally, there is little or no collaboration among countries sharing common resources. Almost all major water resources in the region (surface and groundwater alike) are shared by two or more states. The sources of the main rivers (Nile, Euphrates and Tigris) lie outside the region. Maximum utilization of all supplies necessitates far-reaching cooperation. In a region beset by ethnic, religious and political hostilities, such neighborly good will as has existed in the past may become more elusive in the future.

Dividing the water has been one of the most important issues in peace agreements between the Arabs and the Israelis. Undoubtedly it will affect the outcome of the final negotiations between the Palestinians, Lebanese and Syrians and the Israelis.

THE MAIN WATER PROBLEMS IN THE MIDDLE EAST

In the Middle East there are four main areas where the sharing of water between states could lead to disputes:

- The Nile basin, involving Egypt, Sudan, Ethiopia and other East African states.
- The Tigris/Euphrates basin, involving Turkey, Syria and Iraq.
- The Jordan basin, involving Israel, Jordan and Syria.
- Palestinian-Occupied Territories, involving Israel and the Palestinian Authority.

The problem is an increasing threat to the stability of the whole region. Disputes over the fresh water sources could greatly affect the strategic balance of power in the region and, unless the various countries can agree on sharing water resources, lead to political and perhaps even military conflicts. ⁸

The Nile Basin

Nine states share the Nile basin: Egypt, Sudan, Ethiopia, Uganda, Kenya, Tanzania, Zaire, Rwanda and Burundi. Of these only Egypt is wholly dependent on the Nile for water, while at the same time she controls none of the river's sources. The waters of the Nile are derived from rainfall on the Ethiopian Highlands (85%) and the catchment areas of the Equatorial Lakes (14%). No comprehensive agreement involving all the states of the Nile basin has ever been signed; however, there have been agreements between Egypt and Sudan, and between Egypt and Uganda in 1959.

Until the construction of the Aswan High Dam, extremes of low or high water could bring disaster to Egyptian agriculture. The High Dam and Nasser Lake--by making available water stored during years of high flood--have clearly spared Egypt the worst effects of drought. By the end of the century, Egypt will need at least ten percent more water than is presently available.

Ethiopia, which is the source of the majority of the Egypt's water, has often indicated that it wants to use more of the Nile water for irrigation. The intended dams on the Blue Nile could mean less water's reaching Sudan and Egypt. For the foreseeable future, Ethiopia will be too poor to finance major projects from her own resources and will not be able to secure international financing without Egyptian and Sudanese agreement.⁹

The Tigris/Euphrates Basin

Iraq and Syria have been concerned by Turkey's Grand Anatolia Project (GAP), a huge irrigation and hydroelectric scheme involving the construction of over twenty dams on the Euphrates and Tigris by the end of this century. The largest of the sub-projects, the Ataturk Dam, was completed in 1989, and, in January 1990, Turkey cut the flow of the waters of the Euphrates for a month in order to fill the lake behind the dam. As a result, Syrian and Iraqi hydroelectric stations and irrigation schemes were unable to function at full capacity.

Experts forecast that the GAP will have a serious impact on the rivers' flow into Syria and Iraq. Water quality could also be reduced, as water used for irrigation in Turkey may carry salts, fertilizers and pesticides back into the rivers.

Neither Syria nor Iraq can do much to halt Turkish plans. Turkey is in a strong geographical and military position and is not dependent on outside finance or expertise. She has engaged Syria and Iraq in ministerial talks on the water issue, and so far serious disputes have been contained. It was expected that the Rafa Party, headed by the new Turkish prime minister, Erbakan, would deal positively with the water dispute with Syria and Iraq, but there have been no developments in the last year. 11

The Jordan Basin

The ongoing conflict over the Jordan River Basin is complex; it is perhaps the most difficult current water dispute to resolve. The Jordan River's discharge is less than two percent that of the Nile, but it is exceptionally important to the countries involved. The Jordan River is fed by four upstream rivers: the Dan, the Hasbani, the Banias and the Yarmouk. As a result of capturing territory in the 1967 war and carving out a security zone in southern Lebanon, Israel is now the de facto upstream state for most of the Jordan River basin. This gives Israel substantial control over, and access to, the major share of the Jordan River water. Of particular interest, the headwaters of the Banias are located on the Golan Heights, and the Golan Heights contribute waters to

Hasbani and to Lake of Tiberius, a holding lake on the Jordan River. Jordan has been left extremely vulnerable, as the majority of its water comes from the Jordan River. 12

In early 1960s, Israel constructed the National Water Carrier, which conveys water from Tiberius Lake to the populous coastal plain and down to Negev Desert, at a rate of one million cubic meters a day. Syria has built a number of small dams on Yarmouk River and its tributaries; Jordan built the King Talal Dam on the Zarqa in the early 1970s. Jordan's most ambitious project, however--the construction of Unity Dam on the Yarmouk--has been blocked by Israeli objections, and its usefulness has been called into question by Syrian obstructions upstream. ¹³

The dispute over water was negotiated as part of the Madrid peace process. An Israel-Jordan Peace Agreement was signed that recognized Jordan's right to the domestic use of the minimal amount of water needed for its survival.¹⁴

Palestinian Underground Waters

Israel has occupied the West Bank and Gaza Strip since the 1967 war and has heavily exploited the water from their aquifers. The West Bank is a high-land area that catches rainfall off the Mediterranean; its subterranean aquifer tilts toward the coast and crosses the former Israeli borders. Israel is now heavily dependent upon this aquifer, counting on it for twenty-five to forty percent of its sustainable water supply. Until restrictions were put in place in 1990, Israel had consistently overdrawn its quotas of water from this aquifer, and it still heavily restricts Palestinian use. Meanwhile, the

Israelis have drilled new wells (700-1200 meters) to supply Jewish settlement.¹⁵ Approximately eighty percent of this water is taken by either Israel or its West Bank settlers, with only twenty percent allocated to the Palestinians. Although Israel could continue to withdraw water from the aquifer west of the Palestinian borders, the return of the West Bank to Palestinian control would inevitably mean Palestinian control of the waters that are pumped to the Israelis.¹⁶

As a result of Israeli water policy in the Gaza, eighty-two Palestinian wells have run dry. Israel has built fifty wells, exhausting forty-one percent of the total underground water. In Gaza, the aquifer is contaminated by sea water, because of the Israeli rate of consumption. Additionally, increased use of chemical fertilizers has led to increased chemical content, leaving eighty-five percent of drinking water wells unfit for human use, and a health threat to the Palestinians. The water issue is considered one of the most critical facing the Palestinian-Israeli peace negotiations.

EVALUATION OF EXISTING WATER PROJECTS

Besides the traditional means of supplying thirsty homes and farms, new sources have been tapped by nations in the Middle East. During this century many ambitious projects have been executed in the region to increase the sources of water. However, such projects should be evaluated according to economic, security and long-term exploitation measures.

In 1970 Egypt completed the construction of the Aswan High Dam. In Nasser Lake, the largest manmade lake in the world, the dam impounded up to 160 billion cubic meters--three or four times the amount of water then utilized annually in Egypt. The High Dam has brought considerable benefits to Egypt's economy, and it has saved Egypt--thus far--from the consequences of drought. As long as the lake is sufficiently full, water can be released as needed, to maximize its utility in generating electricity, promoting navigation, expanding irrigated lands, and intensifying year-round cropping. The lake itself affords possibilities for tourism and recreation, as well as developing a fishing industry. The negative effects of the High Dam include blocking the fertile silt, which is important for land fertility, preventing the erosion of the river banks and erosion along the Mediterranean coast beyond the river's outlet, and inducing salinity problems outside irrigated lands.¹⁸

In the early 1960s, Israel constructed the National Water Carrier (NWC), a giant pipeline three meters in diameter, which conveys water from the Tiberius Lake to the populous coastal plain (including Tel Aviv), and down into the Negev Desert, at a rate of one million cubic meters a day, for irrigation, industrial, and domestic use. ¹⁹ The NWC enabled Israel to increase the extent of irrigated farmland from about 300,000 hectares in 1948 to over 200,000 hectares in the late 1980s. The increased withdrawals, coupled with the reduced inflow due to the droughts of the late 1980s, caused the water level of the Tiberius Lake to fall by the summer of 1991 to its lowest-ever level, which would be

likely to deteriorate the water quality in the lake. The country's aquifers were also in danger of depletion due to pumping from Lake Tiberius at such a high rate. 20 Perhaps the most promising means of increasing water supply in the Middle East is desalination. A very old method taught by the Aristotle,21 desalination works best when it converts brackish water rather than salt water. Presently, desalination is expensive because of high energy costs to convert brackish and sea water to relatively high quality water, but it is easier to manage than other alternatives because it requires no international cooperation. Many experts once believed that nuclear energy would be cheap and available to most countries throughout the Middle East. However, nuclear energy sources did not materialize. Sixty percent of the world's desalination capacity is in the Gulf countries. Saudi Arabia's desalinated water alone exceeds thirty percent of global production, while Kuwait and all other Gulf states are almost totally dependent on desalting plans for their fresh water supplies. There are fears that Saudi Arabia's immense plants could become targets for aggression, and all the Gulf states are strategically vulnerable to a full attack or to sabotage against their desalting capacity.²²

With government subsides and assistance, farmers pump fossil water, notably in Saudi Arabia, to produce grains in an uneconomic way for export. Infra-red satellite pictures suggest that "fracture zones" stretching for hundreds of miles may hold billions of cubic meters of water. Unfortunately, however, the fossil water has never been replaced. In few decades these aquifers will run dry. ²³

In Libya, the government has embarked on the Great Man-Made River Project, a \$25-30 billion scheme intended to pipe more than five million cubic meters of water a day across the desert, from wells in southern Libya, for agriculture and urban use along the Mediterranean coast. The British Foreign & Commonwealth Office estimated that the project is extremely expensive compared to building desalination plants.²⁴

POTENTIAL WATER PROJECTS

Among the numerous visionary schemes for long-distance interbasin water transfer, some--though proposed after detailed evaluation--have been halted for financial, technical, political or domestic reasons. With mutual understanding between the concerned countries and international support, these schemes can afford reasonable quantities of waters to neighboring areas, which are critically in need of them.

To secure greater supply of water from the White Nile, Egypt and Sudan planned to construct the Jonglei Canal. The idea was to augment the flow of the White Nile by cutting a canal to bypass the Sudd swamps, where half the flow of the river evaporates as it moves slowly through them. Speeding up the flow would save from evaporation a volume of water equivalent to some six percent of the flow of the Nile below Khartoum. That attempt has been thwarted by the war in southern Sudan, which halted work on the canal.²⁵

In 1980 the Turkish government proposed two "Peace Pipelines" to carry water to desert countries. They would carry the unused flow of the Seyhan and Ceyhan rivers in south Turkey to thirsty cities and industrial areas of Arab lands. The plan envisages two pipelines. The western, requiring more pumping to reach the higher elevations of Damascus and Amman, would carry 3.5 million cubic meters of water nearly 2,700 kilometers across Syria and Jordan to the Saudi Arabian cities of Mecca and Medina. The longer eastern pipeline would cross Syria and Iraq, ultimately supplying Kuwait and the Gulf states of the peninsula in addition to coastal Saudi Arabia. Two drawbacks pose almost insurmountable obstacles to the proposal. The first is cost, initially estimated at \$21 billion for construction, plus pumping and other operating expenses. The second difficulty is security against interruption by government directive or politically related sabotage.²⁶

The idea of purchasing Litani water from Lebanon and transferring it to Lake Tiberius for the benefit of Israel, the West Bank, and Jordan has been raised repeatedly over the years. The Lebanese themselves suggested this possibility during their negotiations with U.S. envoy Eric Johnston in 1955. The disadvantage for the Lebanese of such diversion of Litani water into the Jordan basin would be the loss of that water's energy potential. An alternative, therefore, would be to catch the water excess downstream, near the river's outlet to the sea and after its energy has been utilized. That water could then be piped southward along the coast of Israel and used either for direct

irrigation in the spring season, or for recharging the coastal aquifer for utilization during the summer. In this case, an agreement might be reached whereby the amount of water received by Israel would require it to free up an appropriate volume of water from other sources for the use of the Palestinians and the Jordanians.²⁷

The planned dam on the Yarmouk, near Maqarin, is to be a joint Jordanian-Syrian project; thus it has been given the hopeful name wahdah (meaning "Unity"). The construction of this 100-meter-high dam, with a projected storage capacity of 250 million cubic meters, requires regulation and diversion structures that will divide the Yarmouk flow among Jordan, Syria, and Israel. Israel has opposed the scheme out of concern that it might affect its share of the water supply, and its opposition blocked the requested financing by the World Bank. Jordan counters the Israeli objection with the contention that the share of the Yarmouk allocated to Israel under the Johnston plan* represents less than three percent of Israel's water supply, and that the true reason for the Israelis' objection is to protect their own excessive withdrawals of water from the Yarmouk at the expense of the kingdom's rightful share.²⁸

The Middle East is historically in conflict over sharing water resources. To increase these resources and to divide them fairly, a greater international role is needed to improve the political environment in order to increase the possibility of achieving some

^{*} Johnston plan is explained in details in pages # 22 & 23.

restricted water projects and to reach just and permanent agreements for water disputes in the region.

POLICY OPTIONS

The linkage between water scarcity and conflict is clear. The question is, what can be done that might modify the conditions that could lead to conflict? Traditionally, the answer to this question was to search for additional supply sources. However, the best thinking on the subject now argues that water-demand management is the key to improving the balance of supply and demand in order to mitigate future conflict.

Because agriculture in most countries in the region accounts for over eighty percent of the total water usage, tremendous opportunities exit in this area for water savings. As a result of over-irrigation and evaporation during transport, irrigation efficiencies worldwide are only thirty-seven percent. Experts suggest that more efficient canal-system management could save fifteen percent of irrigation water losses. Advanced irrigation technologies substantially improve efficiencies. Row crops such as cotton, when irrigated with a drip-irrigation system, had a fifty percent increase in product value over traditional sprinkler irrigation. Drip irrigation in combination with other policies has reduced water use per irrigated acre by one third, even as crop yields have increased.²⁹

The most significant indirect method to reduce agriculture water demand is charging farmers for use of water on their farms. Historically, irrigation water has been free. Though not practiced globally to a large extent, charging farmers for water could work well in reducing the demand for irrigation waters³⁰ and seek modern ways of irrigation which increase the land production to make a reasonable balance between the extra costs of water and the crop prices

Rationing water is the most direct tool that countries can use to reduce demand for water. Though rationing is seldom all-inclusive, it "brutally" provides the desired outcome of reducing water demand.³¹

Recycling of sewage and other waste-water has apparently reached the greatest extent in Israel, where 30 percent of it is reused in agriculture. The potential to recycle exits in other countries as well, but the process requires well trained personnel and careful monitoring of pollution.³²

WATER AND WAR

The water scarcity in Palestine was felt initially by the Zionists. By the early 1900s, the Zionists were funding hydrological and economic studies of the water systems in the area. Zionist leaders in Europe actively lobbied the French and British governments to adjust the northern borders of Palestine so as to include the whole catchment of Jordan and Yarmouk rivers and a large part of the lower Litani River.

Seeking to fulfill the Zionist dream, the new state of Israel manifested its awareness of and need for additional water resources during the 1948 war, when the Jewish State occupied Lebanese territory west of its northern tongue to the left bank of the Litani River.³³

In 1959, Israel announced that it planned to divert the waters of Jordan river all the way to the Negev Desert. Syria reacted by initiating a plan to divert Israel's fair share of the headwaters from the river, which was a main reason for 1967 war in the Middle East.

Israel is now dependent on a captured resource, and its water deficit is predicted to become even more acute. These factors will complicate the economic future of the West Bank, southern Lebanon, and the Golan Heights. This highlights another aspects of the conflict, that opposed states may use military means to extract hydrological advantages over each other.

During the Gulf War II, both sides targeted waterworks such as dams, desalinization plants, and water conveyance systems. The coalition air forces destroyed Baghdad's water supply and sanitation systems. In turn, most of Kuwait's desalinization capacity was destroyed by the retreating Iraqi troops. Those events showed how vulnerable are the desalinization installations in the Gulf region.

In 1979, Egyptian president, Anwar Sadat declared, "[t]he only matter that could take Egypt to war again is water." He was referring to Ethiopia's purported intent to

utilize some of the water of the Blue Nile,³⁴ which considered the main artery of water supply to Egypt's life.

Another incipient issue is the growing tension among Turkey, Syria, and Iraq over the Euphrates River. In 1974, Iraq threatened to bomb the Al-Thawra dam in Syria and massed troops along the border, alleging that the flow of water to Iraq had been reduced by the dam. In 1990 Turkey completed construction of the giant Ataturk Dam, the largest of the twenty-one dams proposed as part of its Southeast Anatolia Project. That year, Turkish President Ozal threatened to restrict water flow to Syria if it did not withdraw its support for Kurdish rebels raiding southeast Turkey and disrupting the water projects there. The threat was a plausible one, as Turkey had in fact interrupted the flow of the Euphrates for a month to partly fill the reservoir. Despite advance notification by Turkey of the temporary nature of the cutoff, Syria and Iraq protested the closure and threatened to retaliate. Active hostilities were averted at the time, yet the problem continues to fester and may erupt once again at any time.³⁵

But, what after war? The Israeli water commissioner Gideon Tsur predicts, "[t]he likelihood of war over water is there, but after the war ends, there still won't be enough water to go around."³⁶ From the diplomatic perspective, environmental security issues, such as tensions over scarce water resources, may serve as a useful vehicle to promote communication and goodwill among potential regional combatants. Thus, while water-

resources scarcity may lead to conflict, it may also advance the foreign policy objectives of the other nations in the region.

CRITERIA FOR SHARING INTERNATIONAL WATERS

International peace and amity, as well as economic progress, depend on having a set of just and realistic principles and mechanisms to help in resolving disputes over water whenever the nations directly involved cannot agree among themselves. In such cases, international technical and financial institutions can contribute data, expertise and resources to promote cooperation rather than strife. In a civilized world, there should be universally accepted norms or criteria by which to resolve international disputes peacefully. These norms should be based on universally recognized principles of justice and should be codified formally in a set of laws and procedures. Ideally, there should also be institutions capable of applying international law to adjudicate disputes over environmental assets or resources such as water.³⁷

The Environmental Modification Convention of 1977, negotiated under the auspices of the U.N., specifies in Article I.1: "Each state party to this convention undertakes not to engage in military or any other hostile use of environmental modification, techniques having widespread, long-lasting or severe effects as the means of destruction, damage or injury to any other state." Similarly, no satisfactory water law

has been developed that is bending on all nations. The first step in such development must be the promulgation of a set of principles on which to base a legal code.³⁸

In recent decades, international organizations have attempted to devise more specific principles and concepts governing shared fresh-water resources. The International Law Association, an agency established under U.N. auspices, stated that a water course must be considered in terms of a drainage basin, or catchment. It then attempted to formulate general rules for the usage of internationally shared water courses.

Article IV of the Helsinki Rules specifies the guiding rule: "Each basin state is entitled, within its territory, to a reasonable and equitable share in the beneficial uses of the waters of an international basin." However well intentioned and high-minded, that statement begs a number of issues. What is reasonable? What is equitable? What are beneficial uses?

To provide additional criteria by which those ambiguous terms can be applied in practice, Article V of the Helsinki Rules lists several factors to be considered. Loosely defined, these include consideration of each state's (1) proportion of the catchment area; (2) proportionate contribution to the annual flow; (3) prevailing climate; (4) prior and present patterns of water use; (5) economic and social use; (6) costs of alternative means for satisfying those economic and social means; (7) size of the population dependent on the water resources; (8) availability of the alternative water resources; (9) actions to

avoid the waste of water; (10) possibility of providing compensation to redress conflict over water; and (11) possibility of satisfying water needs without harm to another state.³⁹

The Helsinki convention stops short of specifying an order of priority among these overlapping and conflicting criteria for establishing "equitable," "reasonable," and "beneficial" use of the water of a shared basin. Nevertheless, these rules—albeit vague and ambivalent—are important in that they tend to shift international water disputes from contests of power to considerations of fair rights and mutual obligations. They imply more than they specify. Inherent in the rules is the responsibility of each state to use water efficiently and to avoid depriving or damaging a co-riparian state.⁴⁰

The Helsinki Rules were a promising start, but only a start, toward creation of a comprehensive global code of law to govern the management of internationally shared water resources.⁴¹

The old Harmon Doctrine, which held that each sovereign state is entirely free to use water within its borders without restriction, even if that use might injure a neighbor. While some upstream nations still cite the Harmon Doctrine, more than 100 extant river treaties restrict the freedom of action of upstream nations.

So, in the final analysis, the allocation of water remains a subject of negotiation and--in cases of disagreement--of arbitration and judgment by an objective intermediary.⁴²

WATER AND PEACE

The Arab-Israeli peace process in the Middle East has had a positive impact on improving the climate for existing and potential agreements over water disputes. It has given the concerned parties a better chance to conduct more detailed studies of water resources and to exchange experiences of the most economical ways of using the available waters.

As a result of the peace agreement between Egypt and Israel, Egypt has taken the initiative to build an eastward canal to convey water from a distributary of the Nile Delta toward Sinai. That canal already has a length of eighty-seven kilometers and reaches across the Suez Canal. The Egyptians are planning to complete the canal into northern Sinai. They emphasize that, while the function of this canal will be confined to irrigating land in Sinai, the same canal may well have the technical capacity to convoy water to Gaza as well.⁴³

Significant progress occurred on October 17, 1994, when Jordan and Israel agreed on a draft treaty that shares water resources, settles border disputes, and insures the security of both.

Past Israeli opposition to Palestinian autonomy has been not only political but also linked to the practical significance of control of the land and its resources. As a result of the peace process between the Palestinians and the Israelis, there are indications that more equitable long-term solutions are under serious discussion. For example, the draft

agreement on Palestinian self-rule, as approved by the Israeli cabinet, provides for cooperation in the field of water, to include a Water Development Program prepared by both the Palestinian and Israeli experts. The program is to specify the means of cooperation in managing water resources in the Occupied Territories and is to include proposals for studies and plans on water rights of each party. Equitable utilization of joint water resources is also to be discussed. Additionally, both Israelis and Palestinians will cooperate through the ongoing multilateral peace efforts in promoting a regional development program, which will include an Infrastructure Development Program to regulate water, electricity, transportation and communication. As Palestinians develop the infrastructure necessary for autonomy, water and resources issues are likely to dominate the agenda.

The picture will be completed when both Syria and Lebanon become fully engaged in the peace process. By then, a long-lasting, comprehensive, and integrated agreement based on just and secured sharing of all water resources around the region may finally exist.

THE UNITED STATES' ROLE

Several U.S.-sponsored plans to negotiate water agreements in the Middle East have been proposed over the years. In 1944 Dr. Walter Clay Lowdermilk, serving as deputy of the U.S. Soil Conservation Service, developed an energy development plan for

Israel and Jordan Valley. Though never fully implemented, Lowdermilk's concept inspired Israeli engineers to transfer water out of the Jordan River basin by way of a National Water Carrier to the coastal plains.⁴⁶

The U.S. efforts included the 1956 Johnston Plan, which was one of the earliest comprehensive attempts to solve disputes arising over distribution of Jordan River waters and the first major U.S. initiative on Middle East riparian rights issues. It helped define relations among the contending parties.⁴⁷ It was a compromise plan based on differing proposals from Jordan Lebanon, Israel, and Syria. It was based on a recommended formula for equitable division of the waters.⁴⁸ The Johnston Plan was not formally accepted by the Arab states. However, the plan succeeded de facto in gaining acceptance of the principle of regional water allocation by the countries in the region. Years later, Arab states submitted claims to the international community that Israel was violating water-allocation agreements stipulated in the Johnston Plan that their leaders had once rejected. Such tacit acceptance has allowed each country to develop its lands based on known water values.⁴⁹

'The U.S., with its position as the only supper power in the world, its distinguished influence in the Middle East, and its advanced technology has never been in a better position to help achieve a long-lasting water solution in the region. Its strong involvement in the peace process continues to increase Arab confidence that the U.S.

truly desires a balanced and fair peace and that it can take a lead in building a regional approach to solving water problems in the Middle East.

Creating a U.S.-Middle East water program to encourage the development of advanced water technology is very important to overcome the water problems in the region. This multilateral program could be loosely patterned after existing bilateral commissions and foundations. The program would cover a wide range of technical issues, including pollution control, horticulture, water-reuse strategies, and application of solar energy to water technologies. Special emphasis on research related to desert regions would have application for the Middle East. The program would also undertake research in social sciences pertinent to the human dimension of water issues. Regional experts would be engaged, both as representatives of their respective governments and as water authorities in their own right. Research would be shared with all participating countries and would not be linked to the Arab-Israeli peace process.

The U.S. should accelerate training programs to familiarize specialists from the region in advanced water management and conservation techniques. Expanded training programs would also encourage regional self-sufficiency.

A central coordinating body should be established within the U.S. government for all Middle East water research and development programs. This interagency group would serve as a data clearinghouse for the government's work on water issues on a long-term basis. This interagency coordinating body should be responsible for alerting

the U.S. government to potential water crises. The executive arm of this coordinating body should designate an agency within the U.S. government to serve as the secretariat for it. An annual report, drawing on both classified and unclassified data, would be presented to the Congress and the President every year.⁵⁰

CONCLUSION

Water resources scarcity in the Middle East is an environmental security issue that affects regional stability. Vital proposed projects to increase water supplies have been hindered because of the numerous diversities among the concerned states in the region; however, some other considerable projects have been constructed during the last fifty years. Unfortunately, the catastrophic population growth has overwhelmed the marginal improvements and exacerbated water scarcity tensions. It is difficult to prove that only water causes conflict in the Middle East. Conflict generally has multiple causes, and it may be that water will serve as the catalyst to ignite an existing flammable mixture of ethnic, religious and historical diversities.

Technology, developments in international legal doctrine, a peaceful environment, conservation, and demand-management policies can contribute in reducing the imbalance between the supply and demand of fresh water. From the diplomatic perspective, environmental security issues such as tensions over scarce water resources may serve as

a useful vehicle to promote communication and goodwill among potential opponents in the region.

At the present time the United States, with its historical role, advanced technology and partnership in the peace process, is the only country in the world capable of exerting leadership on water resource development and cooperation in the Middle East.

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- 36. Barry Chamish. "The Arabs Want All the Water." World Press Review 42 (January 1995) 38 39.
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